Organization Bldg/R United States Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450 If Undeliverable Return in Ten Days

\$ \$01.17U

Numed From: 22511 US POSTAGE

OFFICIAL BUSINESS PENALTY FOR PRIVATE USE, \$300 AN EQUAL OPPORTUNITY EMPLOYER

COLB055 060022001 1108 04 02/25 FORWARD TIME EXP RTN TO SEND :CANTOR COLBURN LLP 20 CHURCH ST #22 HARTFORD CT 06103-1221

RETURN TO SENDER

MAR 08 2009
USPTO MAIL CENTE

 $\{i_1\}_{i=1}^{M_1}, \{i_1\}_{i=1}^{M_2}, \{i_2\}_{i=1}^{M_2}, \{i_3\}_{i=1}^{M_2}, \{i_4\}_{i=1}^{M_2}, \{i_4\}_{i=1}$

United States Patent and Trademark Office

TAN

United States Patent and Trademark Office Address: COMMISSIONER FOR PATENTS P.O. Box 1450 Alexandria, Virginia 22313-1450 www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

Philmore H. Colburn II Cantor Colburn LLP 55 Griffin Road South Bloomfield, CT 06002 02/19/2009

EXAMINER

TRUONG, CAMQUY

ART UNIT PAPER NUMBER

2195

UNITED STATES DEPARTMENT OF COMMERCE

DATE MAILED: 02/19/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,405	11/25/2003	Frank William Brice JR.	POU920030188US1	9082

TITLE OF INVENTION: MEMORY MAPPED INPUT/OUTPUT VIRTUALIZATION

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	05/19/2009

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Stop ISSUE FEE Commissioner for Patents

P.O. Box 1450 Alexandria, Virginia 22313-1450 or <u>Fax</u> (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where

indicated unless correct maintenance fee notifica	ed below or directed oth	nerwise in Block 1, by (a	a) specifying a new corre	espondence address;	and/or ((b) indicating a separ	correspondence address as rate "FEE ADDRESS" for
CURRENT CORRESPOND	ENCE ADDRESS (Note: Use BI		Fe	c(s) Transmittal. Thi	is certific	ate cannot be used for	domestic mailings of the or any other accompanying at or formal drawing, must
Philmore H. Control Cantor Colburn 55 Griffin Road	olburn II LLP South		I h Sta ade tra	ereby certify that that the Postal Service was dressed to the Mail	is Fee(s) tith suffice Stop IS	of Mailing or Transn Transmittal is being cient postage for first SSUE FEE address a 273-2885, on the da	deposited with the United class mail in an envelope above, or being facsimile
Bloomfield, CT	06002						(Depositor's name)
			<u> </u>				(Signature)
			L				(Date)
APPLICATION NO.	FILING DATE		FIRST NAMED INVENTO	R	ATTOR	NEY DOCKET NO.	CONFIRMATION NO.
10/723,405 TITLE OF INVENTION	11/25/2003 I: MEMORY MAPPED I	INPUT/OUTPUT VIRTU	Frank William Brice JR JALIZATION		POU	920030188US1	9082
APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUI	E FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	-	\$1810	05/19/2009
EXAM	1INER	ART UNIT	CLASS-SUBCLASS]			•
TRUONG,	CAMQUY	2195	718-001000				
Address form PTO/S	dication (or "Fee Address" 02 or more recent) attach		(2) the name of a single firm (having as a member a 2				
	less an assignce is identith in 37 CFR 3.11. Comp	A TO BE PRINTED ON iffied below, no assignce oletion of this form is NO		patent. If an assign assignment.			cument has been filed for
Please check the appropr	riate assignee category or	categories (will not be pr	rinted on the patent):	Individual Co	rporatio	n or other private grou	ap entity Government
	are submitted: No small entity discount p	permitted)	o. Payment of Fee(s): (Ple A check is enclosed. Payment by credit ca The Director is herel overpayment, to Dep	ard. Form PTO-2038	is attach	hed. quired fee(s), any def	
a. Applicant claim	atus (from status indicated as SMALL ENTITY statu	is. See 37 CFR 1.27.	b. Applicant is no lo				
interest as shown by the	records of the United Sta	tes Patent and Trademark	Office.	applicant, a regi			assignee or other party in
Authorized Signature				Date		•	,
Typed or printed name				Registration N	lo		
This collection of inform an application. Confiden submitting the complete this form and/or suggest Box 1450, Alexandria, V Alexandria, Virginia 223	ntiality is governed by 35 d application form to the ions for reducing this but /irginia 22313-1450. DC	FR 1.311. The informatic U.S.C. 122 and 37 CFR USPTO. Time will vary rden, should be sent to the ONOT SEND FEES OR	on is required to obtain or 1.14. This collection is e depending upon the ind e Chief Information Offic COMPLETED FORMS	retain a benefit by t stimated to take 12 r ividual case. Any co cer, U.S. Patent and TO THIS ADDRESS	he public ninutes to mments Tradema S. SEND	which is to file (and o complete, including on the amount of tim rk Office, U.S. Depar TO: Commissioner for	by the USPTO to process), gathering, preparing, and the you require to complete truent of Commerce, P.O. or Patents, P.O. Box 1450,

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010. OMB 0651-0033



United States Patent and Trademark Office

UNITED STATES DEPARTMENT OF COMMERCE United States Patent and Trademark Office Address: COMMISSIONER FOR PATENTS P.O. Box 1450 Alexandria. Virginia 22313-1450 www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.		
10/723,405 11/25/2003		Frank William Brice JR.	POU920030188US1	9082		
75	590 0 <u>2</u> /19/2009	EXAMINER				
Philmore H. Colburn II			TRUONG, CAMQUY			
Cantor Colburn LLP			ART UNIT	PAPER NUMBER		
55 Griffin Road South Bloomfield, CT 06002			2195			
Biodilliela, CT 00	0002		DATE MAILED: 02/19/2009			

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 1326 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 1326 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

	Application No.	Applicant(s)			
	10/723,405	BRICE ET AL.			
Notice of Allowability	Examiner	Art Unit			
	CAMQUY TRUONG	2195			
The MAILING DATE of this communication appears on the cover sheet with the correspondence address All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included nerewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS. This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.					
1. X This communication is responsive to the amendment filed on 9 January 2009 and terminal disclaimer.					
2. The allowed claim(s) is/are 1-9, 12-19 now renumbered as	<u>claims 1-17</u> .				
 Acknowledgment is made of a claim for foreign priority una) All b) Some* c) None of the: Certified copies of the priority documents have Copies of the certified copies of the priority documents have Copies of the certified copies of the priority documents have International Bureau (PCT Rule 17.2(a)). * Certified copies not received: Applicant has THREE MONTHS FROM THE "MAILING DATE" noted below. Failure to timely comply will result in ABANDONM THIS THREE-MONTH PERIOD IS NOT EXTENDABLE. 	been received. been received in Application No cuments have been received in this of this communication to file a reply	national stage application from the			
4. A SUBSTITUTE OATH OR DECLARATION must be subminiformal PATENT APPLICATION (PTO-152) which give					
 CORRECTED DRAWINGS (as "replacement sheets") mus (a) including changes required by the Notice of Draftspers 1) hereto or 2) to Paper No./Mail Date (b) including changes required by the attached Examiner's Paper No./Mail Date Identifying indicia such as the application number (see 37 CFR 1. 	on's Patent Drawing Review (PTO- s Amendment / Comment or in the C	Office action of			
each sheet. Replacement sheet(s) should be labeled as such in the	-	•			
DEPOSIT OF and/or INFORMATION about the deposit attached Examiner's comment regarding REQUIREMENT I					
Attachment(s) 1. ⊠ Notice of References Cited (PTO-892)	5. Notice of Informal P	atent Application			
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)	6. ⊠ Interview Summary	(PTO-413),			
3. Information Disclosure Statements (PTO/SB/08),	Paper No./Mail Dat 7. ⊠ Examiner's Amendn				
Paper No./Mail Date 4. Examiner's Comment Regarding Requirement for Deposit of Biological Material		ent of Reasons for Allowance			
	9. Other				
	/Meng-Ai An/ Supervisory Patent Exa	ıminer, Art Unit 2195			
	l .				

	Application No.	Applicant(s)
Interview Summary	10/723,405	BRICE ET AL.
interview Summary	Examiner	Art Unit
	CAMQUY TRUONG	2195
All participants (applicant, applicant's representative, PTO	personnel):	
(1) <u>CAMQUY TRUONG</u> .	(3)	
(2) <u>Sean F. Sullian</u>	(4)	
Date of Interview: 08 February 2009.		
Type: a)⊠ Telephonic b)☐ Video Conference c)☐ Personal [copy given to: 1)☐ applicant 2	²)⊡ applicant's representative]
Exhibit shown or demonstration conducted: d) Yes If Yes, brief description:	e)⊠ No.	
Claim(s) discussed: <u>1,18 and 19</u> .		
Identification of prior art discussed:		
Agreement with respect to the claims f) \boxtimes was reached. g)□ was not reached. h)□ N	/A.
Substance of Interview including description of the general reached, or any other comments: <u>Applicant agreed to amer</u>		
(A fuller description, if necessary, and a copy of the amend allowable, if available, must be attached. Also, where no callowable is available, a summary thereof must be attached	opy of the amendments that w	
THE FORMAL WRITTEN REPLY TO THE LAST OFFICE A INTERVIEW. (See MPEP Section 713.04). If a reply to the GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER INTERVIEW DATE, OR THE MAILING DATE OF THIS INTIFILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW ON reverse side or on attached sheet.	last Office action has already OF ONE MONTH OR THIRTY ERVIEW SUMMARY FORM, \	been filed, APPLICANT IS DAYS FROM THIS WHICHEVER IS LATER, TO
	/Meng-Ai An/ Supervisory Patent Examiner, Art Ur	nit 2195

Application/Control Number: 10/723,405 Page 2

Art Unit: 2195

Examiner's Amendment

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

- 2. Authorization for this examiner's amendment was given in a telephone interview with Mr.Sean F. Sullivan (Registration number: 38,328) on 2/9/09.
- 3. The claims have been amended as follows:
 - 1. A method of performing memory mapped input output operations to an alternate address space comprising:

establishing a first instruction directed to a first memory mapped input output alternate address space associated with an adapter to store data in accordance with resource address designation, said resource address designation configured for decomposition thereof such that said first memory mapped input output alternate address space associated with said adapter is accessible;

establishing a second instruction directed to said first memory mapped input output alternate address space associated with an adapter to load data in accordance with said resource address designation;

Art Unit: 2195

allocating, through a host program, at least one of a real resource and a virtual resource associated with said first memory mapped input output alternate address space to a guest program started by the host program;

ensuring that a process executed by the guest program corresponds to said at least one of the real resource and the virtual resource allocated to the guest program, in a manner that is not visible to the quest program; and

wherein said process issues at least one of said first instruction and said second instruction and thereby causes execution of at least one of said store and load with said first memory mapped input output alternate address space.

- 2. The method of Claim 1 further comprising allocating, through the host program on behalf of the guest program, an error storage area associated with said resource.
- 3. The method of Claim 1 further including virtualization of a resource of one of said adapter to store data and said adapter to load data to a second-level guest process.
- 4. The method of Claim 3 wherein said virtualization of a resource is accomplished and distinguished from a real resource by partitioning a range of resource identifiers into a plurality of portions;

wherein at least one portion corresponds to a virtual resource; and

wherein when at least one of said first instruction and said second instruction specifies a resource identifier corresponding to said at least one portion, the guest program issuing instruction exits, and the host program resumes execution in order to emulate said at least one of said first instruction and said second instruction originally issued by the guest program.

- 5. The method of claim 3 wherein said virtualization provides direct access to at least one of a real resource and a virtual resource of an adapter by a problem-state second -level guest process.
- 6. The method of claim 5 wherein said access is accomplished without involvement from a kernel of a guest operating system; and permits said process operating in a problem-state maximum efficiency in performing the primary input output capabilities provided by said adapter and the associated resources allocated to said process.
- 7. The method of claim 3 further including separating another process operating under said operating system; wherein an separating is established on a perresource basis during said allocating and is enforced during execution of at least one of said first and said second instructions.

Art Unit: 2195

8. The method of claim 1 wherein said first alternate address space is not a portion of the main address space from which said process is executing.

Page 5

9. The method of claim 1 wherein said process issuing said at least one of said first instruction and said second instruction and thereby causes execution of at least one of said store and load with said first alternate address space operates in a problem state of a machine.

10-11. Cancelled

- 12. The method of claim 1 wherein at least one of said first instruction and said second instruction is executed without supervisory state intervention.
- 13. The method of claim 1 wherein said first instruction and said second instruction are semiprivileged instructions that may be executed in a problem state, wherein ownership of a specified resource of a specified adapter determines a privilege required for execution of said semiprivileged instructions.
- 14. The method of claim 1 further including a second memory mapped input output alternate address space associated with a second adapter.

Art Unit: 2195

- 15. The method of claim 14 wherein a storage location in said first memory mapped input output alternate address space maps to a different address than the same location in said second memory mapped input output alternate address space.
- 16. The method of claim 1 wherein said adapter includes address spaces as partitions of said alternate address space.
- 17. The method of claim 1 wherein an address space is governed by at least one of a resource type and storage area types associated with said adapter.
- 18. Storage medium encoded with a computer-readable computer program code, said code including instructions, when executed, cause a computer to implement a method of performing memory mapped input output operations to an alternate address space, the method comprising:

establishing a first instruction directed to a first memory mapped input output alternate address space associated with an adapter to store data in accordance with resource address designation, said resource address designation configured for decomposition thereof such that said first memory mapped input output alternate address space associated with said adapter is accessible;

Art Unit: 2195

establishing a second instruction directed to said first memory mapped input output alternate address space associated with an adapter to load data in accordance with said resource address designation;

allocating, through a host program, at least one of a real resource and a virtual resource associated with said first memory mapped input output alternate address space to a guest program started by the host program;

ensuring that a process executed by the guest program corresponds to said <u>at least one of the real resource and the virtual resource allocated to the guest program</u>, in a manner that is not visible to the quest program; and

wherein said process issues at least one of said first instruction and said second instruction and thereby causes execution of at least one of said store and load with said first memory mapped input output alternate address space.

19. A system for performing memory mapped input output operations to an alternate address space comprising:

a processor;

a means for establishing a first instruction directed to a first memory mapped input output alternate address space associated with an adapter to store data in accordance with resource address designation, said resource address designation configured for decomposition thereof such that said first memory mapped input output alternate address space associated with said adapter is accessible;

Art Unit: 2195

a means for establishing a second instruction directed to said first memory mapped input output alternate address space associated with an adapter to load data in accordance with said resource address designation;

a means for allocating, through a host program, at least one of a real resource and a virtual resource associated with said first memory mapped input output alternate address space to a guest program started by the host program;

a means for ensuring that a process executed by the guest program corresponds to said <u>at least one of the real resource and the virtual resource</u> allocated to the guest program, in a manner that is not visible to the quest program; and

wherein said process issues at least one of said first instruction and said second instruction and thereby causes execution of at least one of said store and load with said first memory mapped input output alternate address space.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CAMQUY TRUONG whose telephone number is (571)272-3773. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng Ai An can be reached on (703)305-9678. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2195

Page 9

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Meng-Ai An/

Supervisory Patent Examiner, Art Unit 2195

Camquy Truong

Applicant(s)/Patent Under Application/Control No. Reexamination 10/723,405 BRICE ET AL. Notice of References Cited Art Unit Examiner · Page 1 of 1 **CAMQUY TRUONG** 2195 **U.S. PATENT DOCUMENTS Document Number** Date Classification Name Country Code-Number-Kind Code MM-YYYY US-6,598,144 07-2003 7.11/203 Bailey et al. Α US-4,916,608 04-1990 718/104 Shultz, Steven S. В US-С US-D US-Ε US-F US-G USн US-1 US-J US-Κ US-L US-М FOREIGN PATENT DOCUMENTS Document Number Date Name Classification Country Country Code-Number-Kind Code MM-YYYY Ν 0 Р Q R s Т **NON-PATENT DOCUMENTS**

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	•
	٧	
	w	
	x	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).) Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.